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RECENT DISCOVERIES IN THE NEWFOUNDLAND FLORA

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(Plates 232-271)¹

Part I. JOURNAL OF 1926 AND 1929

I have already published two extended accounts² of botanical work in Newfoundland and some other papers³ in which the great interest and the relic endemism or isolation of plants in Newfoundland has been much emphasized. Very briefly summarized some of the many

¹ The snap-shots of topography, unless otherwise stated, are my own. The photographs of plants have been prepared, with aid from the Milton Fund for Research of Harvard University, by DR. HUGH M. RAUP or by MR. CHARLES BULLARD, whose unlimited kindness I wish here to acknowledge. The large cost of reproduction of the plates has been wholly met by my ever loyal companion, Mr. BAYARD LONG. The preparation of the maps has been possible through the Milton Fund for Research. The polar projection used in some maps is Goode's No. 201 Pc, copyrighted and published by the University of Chicago. Some plates, cited in early parts of the paper, will appear in later instalments, where more appropriate.

² *A Botanical Expedition to Newfoundland and Southern Labrador* (Contrib. Gray Herb. n. s. no. xl.), RHODORA xiii. 109-162, plates 86-91 (1911).

Two Summers of Botanizing in Newfoundland (Contrib. Gray Herb. lxxvi.) RHODORA xxviii. 49-63, 74-87, 89-111, 115-120, 145-155, 161-178, 181-204, 210-225, 234-241, plates 153-155 (1926, 1927).

³ *The Contrasts in the Floras of Eastern and Western Newfoundland*. Am. Journ. Bot. v. 237-247 (1918).

Persistence of Plants in Unglaciaded Areas of Boreal America (Mem. Gray Herb., no. ii.) Mem. Am. Acad. xv. no. iii. (1925).

Some Relationships of the Floras of the Northern Hemisphere. Proc. Intern. Congr. Pl. Sci. ii. 1487-1507 (1929).

Unglaciaded Western Newfoundland. Harvard Alumni Bull. Jan. 23, 1930 (with photographs of characteristic topography).

Specific Segregations and Identities in some Floras of Eastern North America and the Old World (Contrib. Gray Herb. xciii.), RHODORA, xxxiii. 25-63, plate 204 (1931).

points of phytogeographic interest are: (1) the restricted areas in Newfoundland of at least the later glaciations of the Pleistocene, with the result that a large element of the flora seems to have persisted unscathed through the Pleistocene or, at any rate, through the Wisconsin (or Labradorean) glaciation; (2) the high degree of endemism in the flora of the West Coast, from Cape Ray to Cape Norman; (3) the identity or close affinity of much of the flora of western Newfoundland with that of the Arctic Archipelago and arctic Eurasia and, in some cases, with that of the Cordilleran and Pacific regions of North America; (4) the representation of a number of groups now found mostly in the Southern Hemisphere and the Tropics, but also sharing Newfoundland with Nova Scotia and the Coastal Plain of the eastern United States, a flora apparently of Cretaceous origin which had its interchanges along the now submerged Cretaceous and Tertiary continental shelf; (5) the occurrence, especially on the Avalon Peninsula, of a considerable Atlantic European element unknown elsewhere in eastern America; (6) these isolated or relic elements and the endemic species occurring mostly as localized and often very restricted colonies in the widely diffused and everywhere common and comparatively uninteresting elements of the Canadian and Hudsonian forests, bogs, shores and barrens.

To the field-botanist with temperamental ability to take things as they come, to work under disadvantageous conditions, to overlook the discomforts of perpetually fighting swarms of black-flies and mosquitoes, and to maintain a cheerful enthusiasm in spite of frequent deficiencies of diet and the regular failure of the announced schedules of boats to meet their obligations, western Newfoundland still offers almost virgin and unspoiled territory for fascinating exploration and important botanical discovery. The last general account of the work of parties of which I had the good fortune to be a member covered the summers of 1924 and 1925. The summer of 1926 was largely taken up for botanists of eastern America by the International Congress at Ithaca; but, having a short period of early autumn still available, my ever-ready companion, Mr. Bayard Long, and my genial student, now Dr. John Milton Fogg, joined me after the Ithaca meetings and we went, via Montreal, on one of the sumptuous steamships of the Clarke line to Corner Brook at the head ("bottom") of the Bay of Islands, with the avowed purpose of locating at Lark Harbor, at the southern entrance to the Bay of Islands, thence, when the weather

proved propitious, to go by motor boat southward along the outer cliff-wall to Serpentine River whence we could make a simple approach to the unbotanized Lewis Hills, the highest mountains (2700 ft.) of Newfoundland. We planned to finish the trip by proceeding slightly east of Cape Ray to the region of Burgeo in order to get some idea of the flora of a thoroughly glaciated granitic area, to contrast with the flora of the unglaciated or, at least, recently unglaciated West Coast.

Entering Bay of Islands, we longed immediately to get at the sheer outer wall of trap rock which, broken only by tiny coves, extends far south, to Bluff Head. Passing Lark Harbor and steaming to the head of Humber Arm, we were there met by a motor boat sent in by our prospective host, Mr. Moses G. Sheppard, proprietor of the extensive fisheries at Lark Harbor; and toward mid-afternoon we started back about thirty miles over the steamship's route, to Lark Harbor. The afternoon was windy, with black clouds overhanging the precipitous (nearly 2000 feet high) walls of Blomidon, and, in spite of sweaters and oilskins, we fully approved the local pronunciation, "Blow-me-down." Passing the inner islands of the Bay and the outer cliffs of Blomidon in the evening light, we gazed in awe at the mountain-walls and, reaching Lark Harbor, were greeted from the wharf with the informative: "Well, gentlemen, dis is w'ot we calls de Bay of Hilands." Either way we thought of it the name seemed wholly appropriate, but somehow we got a feeling that we had just drifted ashore and were not supposed to know where we had landed. It was a fortunate haven, however: Mr. Sheppard, a progressive man of fine physique and sturdy character, genial, wholesome and hospitable, and busy through a long day; Mrs. Sheppard, a woman of unusual poise and background, who, with at least two of the daughters, had seen much of the outside world; the twin sons and our efficient skipper, Pennell, alert and, like the others, anxious to make our botanizing successful. The Sheppards also had a fine garden of many vegetables, one of the desiderata in many Newfoundland ports, and we were inclined, as we have not always been at fishing ports, to linger over our meals.

When we awoke on the morning of August 30th, the weather was "dirty" and, in fact, for a full week we did not have a truly "civil" day. We botanized along the shore toward York Harbor, visited some of the islands, spent a day on the inner slope of Lark Mountain,

and on one bright but very windy day Long and Fogg crossed over to explore the desert-like serpentine ridge which flanks the North Arm; but at no time would the wind let up and give us the calm weather necessary if we were to follow the outer sea-wall in a small boat and make a safe entry into the Serpentine. Waghorne had botanized about Lark Harbor, Eames and Godfrey had made a center at the copper mine above York Harbor, and Mackenzie and Griscom had got at Blomidon from Frenchman's Cove; while Wiegand and I, in 1910, had twice visited Blomidon from Benoit's Cove. Consequently, lingering at Lark Harbor merely to take advantage of calm weather, we did not undertake extensive trips away from headquarters. But these short excursions into the neighboring region yielded fair returns, though, of course, Waghorne and his successors had already secured the more interesting species.

The season had been unduly cold; snow of the preceding winter lingered in early September on many slopes; the general verdict was that there had been no summer; and we heard many accounts of unmelted snow-banks extending down to the sea along the Straits of Belle Isle. The vegetation in early autumn was in the usual mid-summer state; the plants which usually flower in late July or early August were just coming into bloom. The immediate neighborhood of Lark Harbor, we had been told, would be quite unspoiled and an ideal place for botanists, "absolutely wild, with lots of sheep and goats." The sheep and goats had had full control; but from among the meagre remnants of vegetation we were able to pull out a solitary *Botrychium simplex*¹ and a few other vouchers which even they had missed.

The inner slope of Lark Mountain, however, had good fences near the base and we soon got into wholly primitive mountain-woods, with *Aster acuminatus* and some other Canadian forest types which are not often seen in Newfoundland; in fact, the *Aster* had been known on the Island only from thickets at the southwest corner, Port aux Basques. Passing above timber line we were out on the open wind-swept lower edge of the tableland, but instead of being arctic-alpine as, in spite of many experiences, we still somehow expected the tablelands of western Newfoundland to be, it was in some features less "alpine" than the shores of the outer Bay. A

¹ It seems unnecessary to encumber the narrative by giving the authors of species which are in the current manuals. They will be noted only in cases of change or for species not in Gray's Manual.

few "arctic-alpine" species of broad range and of general occurrence in almost any bleak or open habitat in Newfoundland were there: the inevitable *Lycopodium Selago* and *L. annotinum* var. *pungens*, *Juniperus communis* var. *montana*, *Agrostis borealis*, *Hierochloe alpina*, *Scirpus cespitosus* var. *callosus* Bigel., *Carex rariflora*, *C. scirpoidea*, *Juncus trifidus*, *Salix Uva-ursi*, *Rubus Chamaemorus*, *Viola labradorica*, *Loiseleuria procumbens*, *Arctostaphylos alpina*, *Vaccinium uliginosum* var. *alpinum* Bigel.¹ and *Diapensia lapponica*. However, these and many others, which in New England we call "arctic-alpine," are so nearly ubiquitous at all altitudes in Newfoundland that they were mostly on our "taboo-list," not to be collected unless an extraordinarily fine or exceptional specimen was found. Consequently, they failed to stir our emotions.

Far more interesting on the tableland were their more southern companions, a group of species characteristic of acid peats of New Jersey, southern New York, southern New England or Nova Scotia, here thriving, as they do on the great diorite tableland of Blomidon to the east, as well as on the high barrens of the interior, in the region of The Topsails (from Kitty's Brook and Gafftopsail east at least to the Millertown region), and in the peats at sea-level in southern Newfoundland. High up above the timber the more continuous mossy carpets were as suggestive of the New Jersey Pine Barrens as they were of the North: the flesh-pink to crimson *Aster nemoralis* and the slender *Solidago uniligulata* everywhere, with such of their regular Pine Barren associates as *Agrostis scabra* Willd., *Muhlenbergia uniflora* (Muhl.) Fern. (var. *terrae-novae* Fern.²), *Eriophorum tenellum* and *virginicum*, *Rynchospora fusca* and *alba*, *Carex exilis*, *trisperma* var. *Billingsii* and *livida* var. *Grayana* (Dewey) Fern.³, *Juncus canadensis* (var. *sparsiflorus* Fern.⁴), *Habenaria clavellata* and *blephariglottis*, *Pogonia ophioglossoides*, *Calopogon pulchellus* (scarce), *Arethusa bulbosa*, *Sarracenia purpurea* and *Utricularia cornuta*. Shallow pools were filled with *Nymphozanthus variegatus* (Engelm.) Fern.,⁵ *Eriocaulon septangulare* and *Potamogeton Oakesianus*; and at the margins of pools or on seepy slopes in the peat the austral *Juncus pelocarpus* abounded, with the austral genus *Xyris* represented by *X. montana* and the austral *Bartonia paniculata* by the endemic

¹ See RHODORA, xxv. 24 (1923).

² RHODORA, xxix. 11 (1927).

³ RHODORA, xxviii. 8 (1926).

⁴ RHODORA, xxiii. 241 (1921).

⁵ RHODORA, xxi. 187 (1919).

var. *iodandra* (Rob.) Fern.,¹ while the famous Pine Barren specialty, *Schizaea pusilla* (MAP 7), nestled among the *Bartonia* and *Rynchosporas*.

Although a novel experience for Fogg, this was an old story to Long and me; in fact, as far back as 1910 Wiegand and I had first met² this wholly unexpected mingling of austral and circumpolar species on the top of Newfoundland (at 2000 feet altitude) on the broad diorite tableland of Blomidon; in 1911 Bartram and I encountered it in the Quarry and Maintopsail region and Wiegand and I had an experience with it on the Avalon Peninsula; and in 1924 Long, Dunbar and I had repeated the list, with a few additional species, on the Long Range back of Port aux Basques.³ But the dominance of this austral flora on the high tablelands of Newfoundland has not yet lost its thrill and we are repeatedly tempted to ascend new blocks of the great dissected tableland (the uplifted Cretaceous Peneplane)⁴ of western Newfoundland to rediscover this amazing "alpine" flora, which to the south and east on the Island comes down to sea-level.

September 1st on Lark Mountain saw the beginning of a hectic fortnight with *Euphrasia*. In ordinary summers *Euphrasia* in Newfoundland is fully flowering in late July and early August, but the "summerless" season of 1926 was so backward that in early September the species were in the prime of flowering. In the subalpine gravels of Lark Mountain the species was *E. Williamsii* (the Newfoundland var. *vestita* Fern. & Wieg.), the dwarf species of the alpine area of the White Mountains with chocolate-purple corollas, known in its typical glabrous form also from the Shickshock Mts. of Gaspé and from headlands along the Straits of Belle Isle, and in the pubescent var. *vestita* on alpine slopes and exposed crests of western and northern Newfoundland and adjacent Quebec Labrador.

We wanted to explore the bare montane islands at the entrance to the Bay of Islands. The strong winds, however, made landing on the highest of the outermost and, consequently, the most inviting (Weebald or Guernsey, 1053 feet high), impossible; but we succeeded in making French or Tweed Island (702 feet) and, with the greatest ease, the inner and sheltered low islands (Wood's, Woody, Seal's

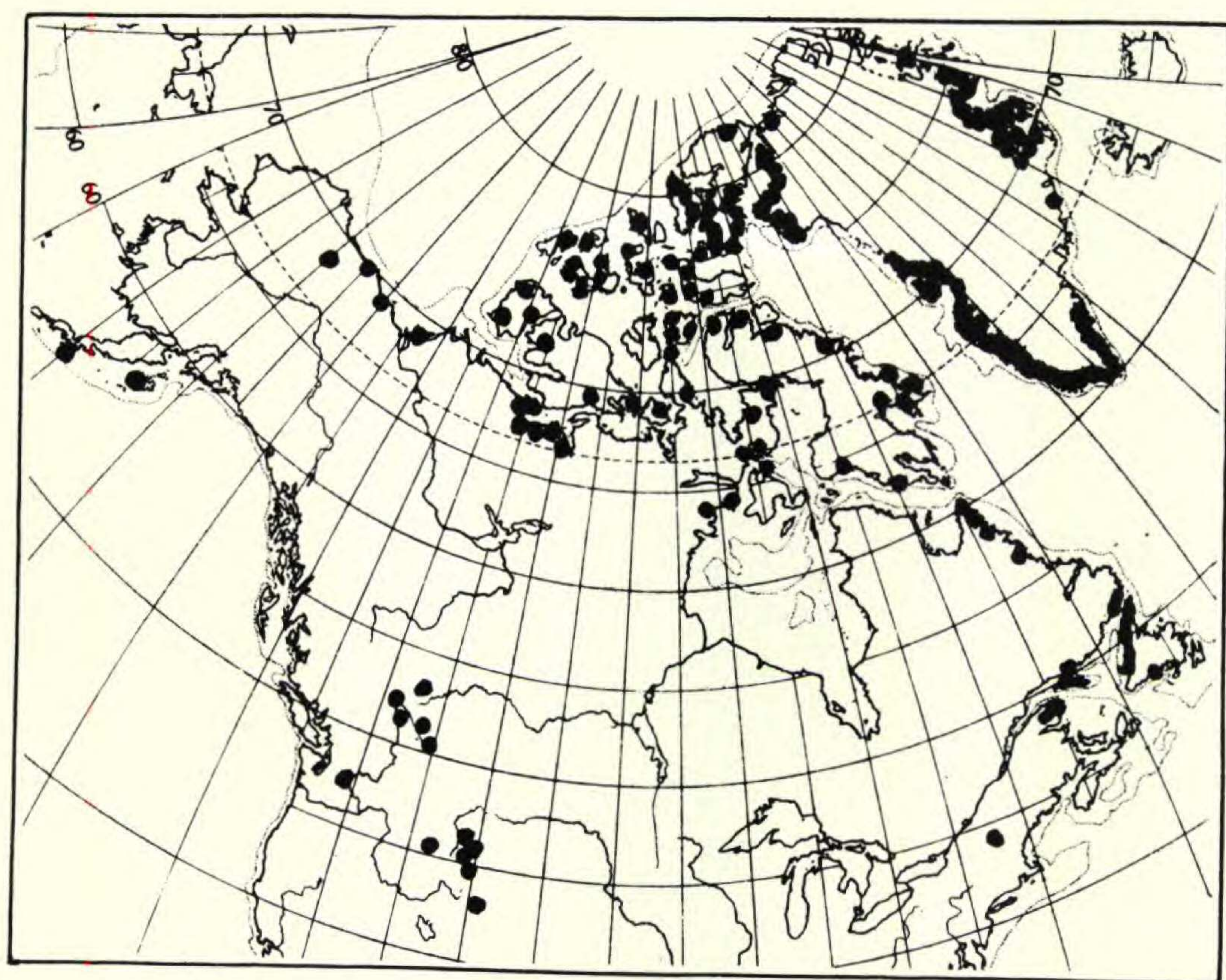
¹ RHODORA, xxiii. 288 (1922).

² RHODORA, xiii. 133 (1911).

³ RHODORA, xxviii. 56 (1926).

⁴ RHODORA, xxxiii. 37 (1931); characteristic portions of the Newfoundland tableland are shown in RHODORA, xiii. t. 87 and xxviii. t. 154.

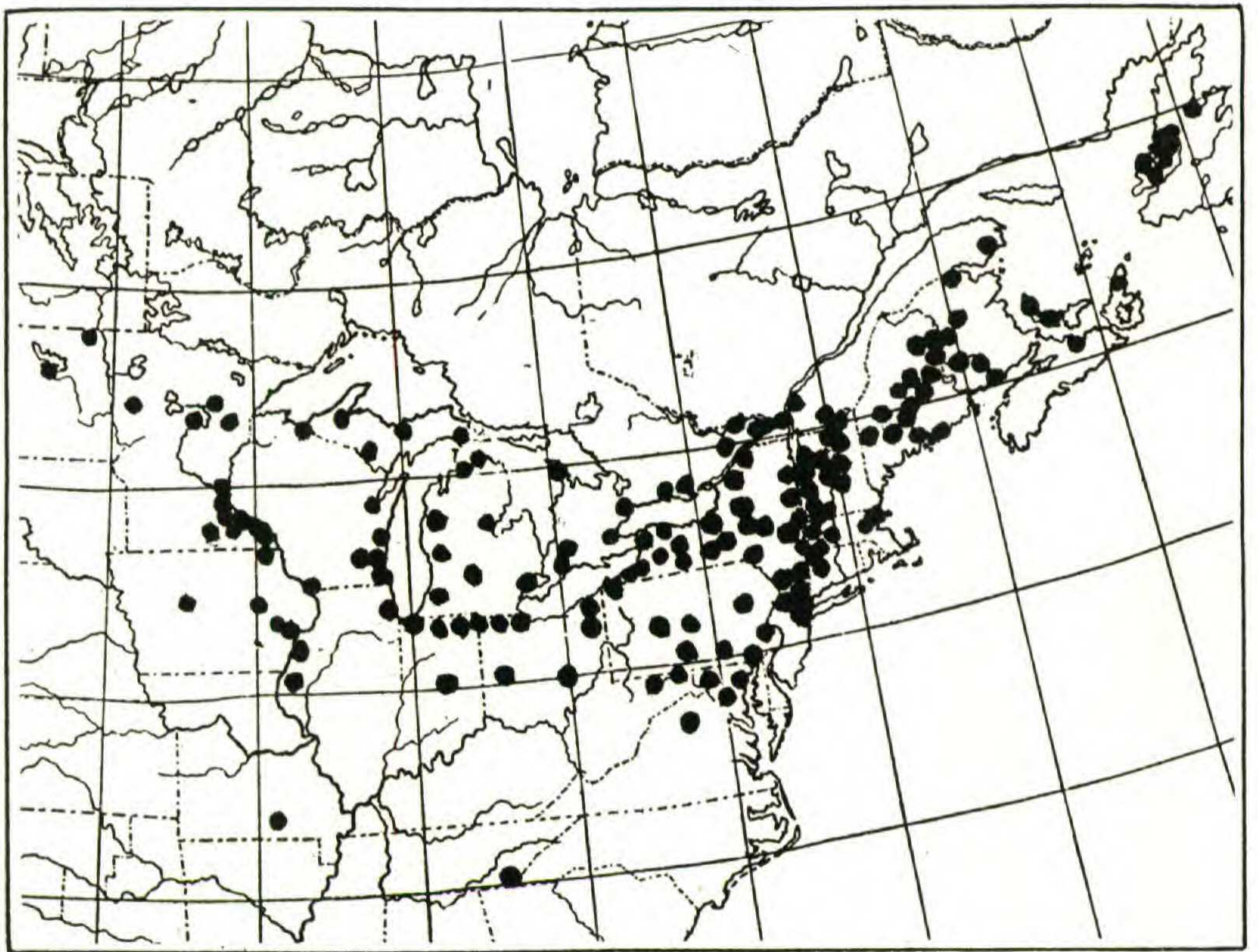
Nest and Governor). As just implied, sea-level on the outer coast is often more "alpine" than the summit-tablelands. Consequently, it was gratifying but not at all surprising to find the ledges (trap) and lower gravelly slopes of French Island carpeted by many species which occur north to latitudes 74° – 85° in Greenland or Ellesmereland and which, in latitude 49° , we should expect to find only on the highest mountains: such species as *Festuca vivipara* (L.) Sm., *Luzula spicata*, *Silene acaulis* var. *excava* (All.) DC. (coming south from lat. 83°), *Draba rupestris* R. Br., and *Saxifraga aizoides* and *S. oppositifolia*



Map 1. American Range of SAXIFRAGA OPPOSITIFOLIA.

(extending south from lat. 85° , MAP 1). The arctic and subarctic *Artemisia borealis* Pall. was here, but with extraordinarily coarse leaf-segments, var. *latisecta* Fern., RHODORA, xxix. 93 (1927); and *Euphrasia* added its quota of puzzles. The endemic goldenrod of western Newfoundland, *Solidago hispida* var. *arnoglossa* Fern., RHODORA, xvii. 2 (1915), characterized by its very large narrowly obovate cauline leaves, was here well developed and so unlike the common small-leaved typical form of the species that in its extreme

development it seems very definite. Transitional material in abundance, however, found both here and in a subsequent year near Bonne Bay, constrains us to maintain it as a geographic variety rather than as a species. Another goldenrod of French Island which greatly perplexed us has the foliage of *Solidago rugosa* but the panicles so condensed that in the smallest specimens they form dense ovoid inflorescences scarcely 2 cm. in diameter. The plant seems to be *S. rugosa* "reduced to its lowest terms," so to speak, at this bleak northern limit of the species.



Map 2. Range of CYPRIPIEDIUM REGINAE.

Other southern species on French Island which seemed absolutely out of place in close proximity to *Silene acaulis* and *Saxifraga oppositifolia* (MAP 1) were *Cypripedium reginae* Walt. (MAP 2) and *Habenaria orbiculata* (MAP 9). The Showy Lady's Slipper had found a protecting thicket by a stream; but *Habenaria orbiculata* was so abundant as to be almost dominant in dry peat and gravel within a stone's throw of the open shore. In New England and eastern Canada we had always thought of it as an orchid of the richest of old woodlands; but its choice of habitat on bleak French Island was only a breaking

of the ice for our next station for it. In 1929 we found it vying with the arctic *Scirpus cespitosus* var. *callosus* (MAP 10) for possession of a sphagnous pocket on the high tableland of Lookout Mountain at Bonne Bay. Yet some critics complain that habitats are not correctly stated in our manuals! If we only could have got a day on Weebald Island, who can say what transgressions we might have found?

The inner and lower islands were less dramatic. Woody Island has some good sandstone ledges along shore; but Wood's Island, inhabited and severely burned, is botanically hopeless, and the other two visited were so slightly explored by us that we found nothing specially notable. The halophytic flora on the sandstone cliffs of Woody Island is particularly fine: all the ordinary halophytes of this region, with various doubtful Chenopods and Polygonums; *Euphrasia purpurea* Reeks amazingly fleshy or succulent; *Cochlearia cyclocarpa* Blake,¹ a biennial, with rosettes of rounded succulent leaves, tasting like a blend of water-cress and horseradish; and the broad-leaved *Plantago juncooides* var. *laurentiana* Fern.² in typical development. *Cornus suecica*, frequent enough along the coast and on the mountains, was here particularly beautiful; and the higher rocks supported good colonies of *Potentilla pectinata* Raf., a species known in Newfoundland from only a few stations, all on the West Coast.

The north-facing wall of the eastern serpentine half of Blomidon drips in many places with moisture from the packed snow and ice of its upper slopes; consequently its flora,³ although limited in number of species, is a rich one for serpentine country (silicate of magnesium, therefore toxic to most plants); and, since the high ridge on the north side of North Arm is also serpentine, and very conspicuous from incoming and out-going boats, we had great hopes of some good things there. So, as a last trip, on a cold and windy day, Long and Fogg, with Pennell and one of the Sheppard boys, crossed in a motor boat to the North Arm. In our optimism we had overlooked one important point: the cold north side of Blomidon faces north and is bathed by melting snows through much of the summer; the hot serpentine slope north of the North Arm faces south and is arid and almost without vegetation. To Long and Fogg the arduous climb over

¹ Blake, RHODORA, xvi. 135 (1914).

² RHODORA, xxvii. 102, t. 150, fig. 5 (1925).

³ See Fernald, RHODORA, xiii. 118, 132 (1911).

arid blocks of serpentine seemed to have few rewards, for nowhere did they find continuous carpets of vegetation, merely scattered plants of a few inconspicuous species. Nevertheless, they got several of the most localized and interesting species of the serpentines of western Newfoundland and thus added an intermediate station for them between Blomidon at the south and The Tableland of Bonne Bay at the north. *Adiantum pedatum* var. *aleuticum* Rupr. was there, of course, as on all the extensive serpentine areas of Newfoundland and Quebec, on the North Arm the most stiffly erect extreme. *Rhododendron lapponicum* was characteristic. In Newfoundland and Gaspé it grows profusely on serpentine barrens as well as on dry limestones; but in neither region have we ever found it on granite or quartzite, although further south, on Katahdin and on Washington, it is on reputedly granitic rock and it seems to be common on the granites and gneisses of Labrador. The failure in the best Rhododendron gardens to make *R. lapponicum* thrive might, perhaps, be averted by giving it a bed of broken serpentine or of magnesian limestone, rather than the usual peat and sand of conventional Rhododendron gardens.

Danthonia intermedia and *Conioselinum pumilum* Rose, in Newfoundland known only on serpentine, were brought back; and Long and Fogg had the two prostrate willows, already known from Blomidon, *Salix cordifolia* var. *Macounii* (Rydb.) Schneider and *S. anglorum* var. *kophophylla* Schneider. The junior member of the party, facetiously inclined to translate the technical names into the so-called "English names" of some of our handbooks, rendered the last "The Cough-loving Willow of the Angles" and suggested that we each carry a bit as a charm against colds. Three of the distinctive Caryophylls of Newfoundland or of Newfoundland and Gaspé were there, as on all the serpentine mountains yet explored in western Newfoundland: *Arenaria marcescens* Fern.,¹ *A. cylindrocarpa* Fern.² and *Cerastium terrae-novae* Fern. & Wieg.³ All three are so interesting and so highly localized that it seems desirable to publish good illustrations of them. *Arenaria marcescens* (PLATE 255) forms broad mats on the driest of serpentine gravel in the Long Range of Newfoundland and on the great tableland of Mt. Albert in Gaspé. Related to various arctic and subarctic species (especially *A. laricifolia* L.

¹ RHODORA, xxi. 15 (1919).

² RHODORA, xvi. 43 (1914).

³ Fern. & Wieg. RHODORA, xxii. 176 (1920).

and *A. arctica* Stev.), *A. marcescens* is nearer related to *A. obtusiloba* (Rydb.) Fern. (*Alsinopsis obtusiloba* Rydb.) of the Rocky Mountains.

Arenaria cylindrocarpa was long confused with the European *A. ciliata* L. and *A. norvegica* Gunn. (*A. ciliata* var. *norvegica* (Gunn.) Hartm., *A. ciliata* var. *humifusa* Hartm.). Several characters separate *A. cylindrocarpa* from both European species but Ostenfeld and some other European students have maintained that it is not specifically separable. Small but characteristic specimens of *A. cylindrocarpa* and of *A. norvegica* (*A. ciliata*, with strongly ciliate leaves, is more remote) are, therefore, shown (PLATE 256) with sufficient details to make their distinctness evident.

Cerastium terrae-novae (PLATE 257), known only from the western Newfoundland serpentines, is geographically very remote from its close relatives. In its large seeds it is somewhat like *C. Earlei* Rydb. of the Rocky Mts., but in the loose testa of the seed (very fragile and freely breaking away) it is nearer the European *C. latifolium* L. For purposes of illustration a very small plant has been selected; when well developed, *C. terrae-novae* may form fuscous-green or purplish mats up to 3 or 4 dm. across.

On this hopelessly barren ridge by the North Arm *Pinus Strobus* struggled against adversity, forming prostrate carpets 2 to 3 meters (6–10 feet) across and only 5–8 dm. (1½ to 2½ feet) high, but heavily loaded with cones, *P. Strobus* forma *prostrata* (Mast.) Fern. & Weatherby, RHODORA, xxxiv. 168 (1932), a far cry from the great White Pines of early New England days with trunks “seven feet eight inches in diameter” “and frequently 250 feet in height.” In 1921 Mackenzie & Griscom found forma *prostrata* on Blomidon. Even the erect trees of *P. Strobus* in Newfoundland depart in some characters from the better developed trees on the continent, having very nodulose branchlets and short leaves, the latter not infrequently in 3’s as well as in the conventional 5’s. These modifications are apparently confined to the northeastern and rather unfavorable limits of the species.

The strong winds making it impossible to land on the outer islands or to reach Chimney Cove (Waghorne’s station for *Erysimum coarctatum* Fern. and other very rare species) or Wild Cove, with “the beach . . . broken white coral” (*Nfd. and Lab. Pilot*), where Waghorne had found the North Pacific *Arenaria peploides*, var. *maxima* Fern. and the remarkable and never rediscovered *Salix*

Bebbiana, var. *projecta* (Fern.) Schneider, it was obvious that the Serpentine and the Lewis Hills were not to be reached this season. So, regretting to abandon them and to leave our hospitable home with the Sheppard family, we moved on to Port aux Basques, thence by the "Portia" to Burgeo.

Whereas Wisconsin glaciation in westernmost Newfoundland failed to denude the tablelands and often left the low forelands with their ancient blankets of deeply rotted rock, Burgeo and the region westward to the eastern base of the Long Range seems to have been scraped clean (PLATE 233). The granitic hills are quite denuded of rotted residual mantle, scratched and gouged as if heavy mattocks and picks had been used on them only yesterday, and littered with great unweathered and obviously transported boulders (PLATE 233). Here we got few of the localized endemics. The tiny *Betula Michauxii* Spach, Newfoundland and Labrador representative of the Old World *B. nana* L., but with unlobed bracts or scales, abounded, as it does in practically all acid peat on the Island; *Empetrum Eamesii* Fern. & Wieg., ROCKBERRY, with its beautiful coral-pink berries, likewise throughout the Island, was on all dry ledges, and the ubiquitous *Agrostis scabra* Willd. (*A. hyemalis* of most recent authors, not *Cornucopiae hyemalis* Walt.) was everywhere, but chiefly in the extreme with very large spikelets which occurs throughout Newfoundland (to be described in Part III). The dry peat of the granitic crests, just as at Port aux Basques and generally eastward to the Avalon Peninsula, was carpeted with *Festuca capillata* Lam., the typical European plant, here certainly indigenous. Damp mossy pockets were the home of the endemic of southern Newfoundland, *Epilobium Pylaieanum* Fern.¹ (PLATE 259), distinguished from the many forms of *E. palustre* by its very short oblong leaves, the oblong and round-tipped calyx-lobes and the unusually long beak of the seed. The original collections, from various stations from Cape Race to Cape Ray, were mostly unbranched, but at Burgeo and westward as far as we went (to the Great Barachois) it was often bushy-branched.

We spent one day between Burgeo and Sand Bank to the west, another about Great Barachois and following up Grandy Brook. In general, the flora was rather uninteresting, though the tedium was occasionally relieved by the finding of some species local on the Island:

¹ RHODORA, xxvii. 33 (1925).

Elatine minima (Nutt.) Fisch. & Meyer, either rare or generally overlooked; *Oryzopsis canadensis* (Poir.) Torr., which we had recently been collecting on Lark Mt.; *Carex hormathodes* Fern., already locally known in both western and eastern Newfoundland; and *Polygonum allocarpum* Blake,¹ for which the Newfoundland voucher had been unsatisfactory. The always surprising *Schizaea*, *Bartonia* and *Xyris* were there, as probably everywhere in southern Newfoundland; but when we finally had to leave for home we felt that we had done our duty by the severely glaciated granitic coast and that the next botanizing trip could rightfully be confined to the always repaying West Coast.

Planning for the next trip, in the summer of 1929, we laid out a very beautiful schedule which we hoped to carry through with aid I had received from the Milton Fund for Research at Harvard. Our optimistic programme closely followed, with amazing and unreasoning credulity, the announced sailings of the local steamers, especially the "Sagona," plying weekly (leaving Humbermouth on Wednesdays) between Bay of Islands and Battle Harbor (Labrador). We were to begin with a day or two at Old Port au Choix, near where Bachelot de la Pylaie, more than a century ago, had spent eight days, and close to Pointe Riche which Wiegand had visited in 1910; consequently, worked out. Wiegand, however, got a foliage-specimen of a very strange willow which Schneider and I had independently considered an undescribed species, but good material was needed. A day or two at Old Port au Choix would suffice; then a trip over to St. John's Island would give an opportunity to secure better material of a "red-seeded" *Taraxacum*, secured over-ripe in 1925. Then Trout River was in the schedule, with its spectacular mountains, and a long trip to the Lewis Hills, to be reached via Port au Port.

The railroad did its part and we kept up to schedule as far as Bay of Islands; but from the day of our arrival to the day of final sailing toward home in September the announced schedule remained abashed in the depth of a pocket-book and the only date actually kept was that of Fogg's departure some days before Long and I were ready to leave.

Reaching the Bay of Islands by train, exactly on schedule, near noon of Wednesday, July 10th, with abundant time to make the "Sagona" at 5 p. m., we learned, to our dismay, that, true to form, she was off

¹ Blake, RHODORA, xix. 234 (1917).

schedule. She had sailed late on the last trip north and "Heaven knew when she would be back." At last account she was taking on halibut on "the Labrador" and this was slow work, each dripping and slippery box weighing 200 lbs. and the contract calling for 1600 boxes to be aboard before she could start south! One commercial salesman of great experience advised us: "Next time wire to Battle Harbor and learn when she will sail south from there. When she has started south, you leave New York for Humbermouth and you will make her all right." No one knew when the "Sagona" would come in nor would they know until she had reached Rocky Harbor at Bonne Bay, only a few hours away. We were living at Davis's at Curling, our trunks and duffle bags were all at the steamship's terminal some miles away, at Humbermouth; but, by making several trips to the latter hotel-less point, we gradually lugged away much of our collecting material and settled down to work in the loft of the steamship company's wharf at Curling, where the agent, Mr. Frank Roach, did everything possible to facilitate our work and to keep us from regretting the loss of valuable time. It was actually a full week before the "Sagona" came in with her heavy cargo of once iced halibut, to be re-iced at Curling, shipped to North Sydney and there re-iced, thence going by train to Boston, New York, Buffalo and Detroit to supply the markets with "fresh" halibut. But our wait was a comparatively short one; a few miles away, as unconscious of our presence in the neighborhood as we of theirs, Mr. and Mrs. Frank Morris, the "Orchid enthusiasts," were spending 10 days at desolate "boom-town" Corner Brook, also awaiting the "Sagona!"

We were in perplexity. The shores of Bay of Islands had been "worked to death" and we dared not go beyond easy reach of the evasive "Sagona." The first afternoon we strolled, by way of much-botanized Mt. Moriah, along the railroad as far as Morley's Pond. The latter area had never been much visited; consequently, we were able to secure two species not previously known in the region: *Equisetum pratense*, abundant in the thicket, the first Newfoundland station south of St. John Bay; and *Potamogeton praelongus*, the abundant winter-buds of the preceding season swashing at the margin of the pond. We had gone especially to secure good material of *Najas flexilis*, seen by Wiegand and me in or near Morley's Pond in 1910, before our collecting equipment of that year had arrived, and left to be collected later. The wind was too strong for us to see it in

1929 and the vouchers still await collection. The springy thickets near the base of Mt. Moriah were white with "Mayflower," *Cardamine pratensis* var. *palustris* Wimm. & Grab., another addition to our list from Bay of Islands; and, in the pastured clearings about Curling and eastward to Crow's Gulch, the English Daisy, *Bellis perennis*, was an abundant weed, a plant frequent enough in gardens but never before in our experience a truly naturalized plant.

Looking from various points on Humber Arm one sees a conspicuous white hill a few miles up the Humber on the north side. I had often viewed it from a distance and had always mentally dismissed it as a badly burned granite or quartzite hill of no botanical interest. But, in desperation for something to occupy us, we decided to go there, for, at any rate, it would be wild and some miles from civilization, surely better than over-botanized Curling and shabby and hustling Corner Brook. So on July 12, Mr. Roach assuring us that the "Sagona" would not be in, he took us by motor boat up river to our hill, Hannah's Head according to established local nomenclature, but Mt. Patricia on modern English-made maps, imposing and rising perhaps 1200 feet above the river, one of the striking features of the famous Humber Gorge.

Landing on the wooded ledges, we at once saw the typical calciphiles of the region; Hannah's Head was limestone and sure to be interesting! The wooded glades were, of course, full of the ordinary plants of limy spruce woods; but, mingled with them here or in the springy openings on the opposite bank of the Humber (between Marble Mt. and Humbermouth), which we visited on two other days, and appearing quite native, were five European plants, two of which, in 1910, Wiegand and I had supposed to be introduced weeds. On the lower Humber, however, they are not aggressive and weedlike but occur with the strictly American and conservative plants of springy glades or openings; nor do they follow the railroad and mingle with the abundant introduced weeds a few miles away in the freight-yards of Humbermouth and Corner Brook. *Linum catharticum* abounds on the open springy banks and runs far up the slope of Hannah's Head in the limestone crevices; *Lathyrus pratensis*, superb in its woodland setting, with rich yellow flowers, extends high up a springy slope opposite Hannah's Head; *Cirsium palustre*, tall and unmistakable, with deep crimson-purple heads in dense glomerules, shares the swamps with the endemic American *C. muticum*.

Springy banks and margins of rills coming down the steep slopes on the south side of the river are bordered by a *Cardamine*, differing at once from the ubiquitous *C. pensylvanica* in its petiolulate rounded leaflets: *C. flexuosa* With., a beautiful European species new to North America. Along the river at the foot of Hannah's Head, on the ledges where we landed, the European *Scrophularia nodosa* L. grew from the crevices and, higher up, above the wooded base of the hill, it grew in many rock-crevices. This was good enough!

(*To be continued*)

ASTER PANICULATUS AND SOME OF ITS RELATIVES¹

K. M. WIEGAND

IN a recent paper in this journal the writer² presented the results of some studies relating to *Aster lateriflorus* and its allies. The present paper is intended to record further studies of the white asters, particularly of those species centering around *A. paniculatus* Lam. In general this group differs from *A. lateriflorus* in the more paniculate, generally non-secund type of inflorescence, more scabrous-ciliate and more rigid rameal leaves, and the usually firmer leaves of the stem. One species of the previous paper, *A. ontarionis*, seems to lie between *A. lateriflorus* and the *A. paniculatus* group, since, as in the latter species, the heads are scarcely at all racemose while at the same time it has softer rameal leaves and deeper corolla-lobes, thus suggesting *A. lateriflorus*. Likewise, another species, *A. saxatilis*, lies somewhat between *A. paniculatus* and *A. vimineus*. *A. praealtus* of the group now under consideration often has distinctly racemose but not secund heads.

A. paniculatus and its relatives have given endless trouble to botanists. One has only to note the numerous names borne by specimens of the various species as they occur in herbaria. Dr. Gray was greatly troubled by them, and his opinion of the white asters was quoted in the previous paper.³ In that paper the writer took the view that a major difficulty with the group has been the failure to recognize

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²RHODORA xxx. 161 (1928).

³See also: Proc. Amer. Acad. xvii. 163 (1882).